

LUXEON CX Plus CoB (Gen 2)

High efficacy with industry
standard footprint

LUXEON CX Plus CoB (Gen 2) family of products delivers a new breakthrough in efficacy for arrays. Available in 80 and 90 CRI across multiple electrical configurations, LUXEON CX Plus CoB (Gen 2) is packaged in industry standard footprints enabling it to benefit from an existing ecosystem for fast and immediate design-in while retaining existing optics, clamps, and documentation.



FEATURES AND BENEFITS

Higher efficacy to benefit luminaire design.

An immediate, effortless upgrade to existing designs currently using legacy CoBs with a square footprint

MCPCB substrate that enables more robust systems than ceramic substrate

2- and 3-step MacAdam ellipse ensuring color consistency from luminaire to luminaire

PRIMARY APPLICATIONS

Spotlights

Track Lights

Downlights

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General Product Information

Product Test Conditions

LUXEON CX Plus CoB (Gen 2) LEDs are tested and binned with a DC drive current specified below at a junction temperature, T_j , of 85°C:

100mA	–	LUXEON CX Plus CoB S01
200mA	–	LUXEON CX Plus CoB M02
350mA	–	LUXEON CX Plus CoB M03
450mA	–	LUXEON CX Plus CoB L04
550mA	–	LUXEON CX Plus CoB L05
800mA	–	LUXEON CX Plus CoB L08

Part Number Nomenclature

Part numbers for LUXEON CX Plus CoB (Gen 2) follow the convention below:

L 2 C 4 – **A A B B C D D D E F F G G**

Where:

- A A** – designates nominal CCT (27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K)
- B B** – designates minimum CRI (80=80CRI, 90=90CRI)
- C** – designates SDCM (2=2-step MacAdam ellipse, 3=3-step MacAdam ellipse)
- D D D** – designates product configuration (example: S01, M02, M03, L04, L05, L08)
- E** – designates options for product specification
- F F** – designates light emitting surface (LES) size (06=6mm, 09=9mm, 12=12mm, 14=14mm)
- G G** – designates options for product specification

Therefore, the following part number is used for a LUXEON CX Plus CoB (Gen 2), 3000K 80CRI, 3-step MacAdam ellipse, M03, 9mm LES:

L 2 C 4 – **3 0 8 0 3 M 0 3 F 0 9 0 0**

Lumen Maintenance

Please contact your local Sales Representative or Lumileds Technical Solutions Manager for more information about the long-term performance of this product.

Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON CX Plus CoB (Gen 2) is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS Directive 2011/65/EU and REACH Regulation (EC) 1907/2006. Lumileds LLC will not intentionally add the following restricted materials to its products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

Performance Characteristics

Product Selection Guide

Table 1. Product performance of LUXEON CX Plus CoB (Gen 2) at specified test current, $T_j=85^\circ\text{C}$.

PRODUCT	NOMINAL CCT	MINIMUM CRI ^[1, 2, 3]	LUMINOUS FLUX ^[1, 4] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	LES ^[5] (mm)	ENERGY EFFICIENCY CLASS ^[7]	PART NUMBER ^[6]
			MINIMUM	TYPICAL					
LUXEON CX Plus CoB S01	2700K	80	448	487	141	100	6	E	L2C4-2780xS01F0600
	3000K	80	469	510	148	100	6	D	L2C4-3080xS01F0600
	3500K	80	481	523	152	100	6	D	L2C4-3580xS01F0600
	4000K	80	489	532	154	100	6	D	L2C4-4080xS01F0600
	5000K	80	489	532	154	100	6	D	L2C4-5080xS01F0600
	2700K	90	381	414	120	100	6	E	L2C4-2790xS01F0600
	3000K	90	403	438	127	100	6	E	L2C4-3090xS01F0600
	3500K	90	431	469	136	100	6	E	L2C4-3590xS01F0600
	4000K	90	438	476	138	100	6	E	L2C4-4090xS01F0600
LUXEON CX Plus CoB M02	2700K	80	887	964	140	200	9	E	L2C4-2780xM02F0900
	3000K	80	942	1024	148	200	9	D	L2C4-3080xM02F0900
	3500K	80	954	1037	150	200	9	D	L2C4-3580xM02F0900
	4000K	80	985	1071	155	200	9	D	L2C4-4080xM02F0900
	5000K	80	976	1061	154	200	9	D	L2C4-5080xM02F0900
	2700K	90	775	842	122	200	9	E	L2C4-2790xM02F0900
	3000K	90	814	885	128	200	9	E	L2C4-3090xM02F0900
	3500K	90	874	950	138	200	9	E	L2C4-3590xM02F0900
	4000K	90	887	964	140	200	9	E	L2C4-4090xM02F0900
LUXEON CX Plus CoB M03	2700K	80	1580	1717	140	350	9	E	L2C4-2780xM03F0900
	3000K	80	1627	1768	144	350	9	E	L2C4-3080xM03F0900
	3500K	80	1694	1841	150	350	9	D	L2C4-3580xM03F0900
	4000K	80	1723	1873	153	350	9	D	L2C4-4080xM03F0900
	5000K	80	1723	1873	153	350	9	D	L2C4-5080xM03F0900
	2700K	90	1331	1447	118	350	9	F	L2C4-2790xM03F0900
	3000K	90	1413	1536	125	350	9	E	L2C4-3090xM03F0900
	3500K	90	1453	1579	129	350	9	E	L2C4-3590xM03F0900
	4000K	90	1513	1645	134	350	9	E	L2C4-4090xM03F0900
LUXEON CX Plus CoB L04	2700K	80	1966	2137	136	450	12	E	L2C4-2780xL04F1200
	3000K	80	2133	2319	147	450	12	D	L2C4-3080xL04F1200
	3500K	80	2155	2342	149	450	12	D	L2C4-3580xL04F1200
	4000K	80	2267	2464	156	450	12	D	L2C4-4080xL04F1200
	5000K	80	2267	2464	156	450	12	D	L2C4-5080xL04F1200
	2700K	90	1736	1887	120	450	12	E	L2C4-2790xL04F1200
	3000K	90	1866	2028	129	450	12	E	L2C4-3090xL04F1200
	3500K	90	1903	2068	131	450	12	E	L2C4-3590xL04F1200
	4000K	90	1958	2128	135	450	12	E	L2C4-4090xL04F1200

Table 1 continued on next page:

1. Lumileds maintains a tolerance of ± 2 on CRI and $\pm 6.5\%$ on luminous flux measurements.
2. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. R9 value of 90CRI products is >50 and for 80CRI products it is >0 .
4. Maximum luminous flux is 10% above typical luminous flux.
5. Light Emitting Surface (LES) is the inner diameter (phosphor area) inside the dam.
6. Part number "x" designates SDCM (2=2-step MacAdam ellipse, 3=3-step MacAdam ellipse).
7. Energy efficiency class as specified in Commission Delegated Regulation (EU) 2019/2015. The available range of energy efficiency classes is A-G.

Table 1. Product performance of LUXEON CX Plus CoB (Gen 2) at specified test current, T_j=85°C continued.

PRODUCT	NOMINAL CCT	MINIMUM CRI ^[1, 2, 3]	LUMINOUS FLUX ^[1, 4] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	LES ^[5] (mm)	ENERGY EFFICIENCY CLASS ^[7]	PART NUMBER ^[6]
			MINIMUM	TYPICAL					
LUXEON CX Plus CoB L05	2700K	80	2407	2616	136	550	12	E	L2C4-2780xL05F1200
	3000K	80	2600	2826	147	550	12	D	L2C4-3080xL05F1200
	3500K	80	2638	2867	149	550	12	D	L2C4-3580xL05F1200
	4000K	80	2775	3016	157	550	12	D	L2C4-4080xL05F1200
	5000K	80	2775	3016	157	550	12	D	L2C4-5080xL05F1200
	2700K	90	2110	2294	119	550	12	E	L2C4-2790xL05F1200
	3000K	90	2247	2442	127	550	12	E	L2C4-3090xL05F1200
	3500K	90	2311	2512	130	550	12	E	L2C4-3590xL05F1200
LUXEON CX Plus CoB L08	4000K	90	2367	2573	134	550	12	E	L2C4-4090xL05F1200
	2700K	80	3535	3842	139	800	14	E	L2C4-2780xL08F1400
	3000K	80	3756	4083	148	800	14	D	L2C4-3080xL08F1400
	3500K	80	3793	4123	149	800	14	D	L2C4-3580xL08F1400
	4000K	80	4020	4370	158	800	14	D	L2C4-4080xL08F1400
	5000K	80	4020	4370	158	800	14	D	L2C4-5080xL08F1400
	2700K	90	3089	3358	122	800	14	E	L2C4-2790xL08F1400
	3000K	90	3287	3573	129	800	14	E	L2C4-3090xL08F1400
3500K	90	3385	3679	133	800	14	E	L2C4-3590xL08F1400	
4000K	90	3482	3785	137	800	14	E	L2C4-4090xL08F1400	

Notes for Table 1:

- Lumileds maintains a tolerance of ±2 on CRI and ±6.5% on luminous flux measurements.
- Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
- R9 value of 90CRI products is >50 and for 80CRI products it is >0.
- Maximum luminous flux is 10% above typical luminous flux.
- Light Emitting Surface (LES) is the inner diameter (phosphor area) inside the dam.
- Part number "x" designates SDCM (2=2-step MacAdam ellipse, 3=3-step MacAdam ellipse).
- Energy efficiency class as specified in Commission Delegated Regulation (EU) 2019/2015. The available range of energy efficiency classes is A-G.

Optical Characteristics

Table 2. Optical characteristics for LUXEON CX Plus CoB (Gen 2) at specified test current, T_j=85°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE ^[1]	TYPICAL VIEWING ANGLE ^[2]
L2C4-xxxxxxxFxx00	135°	115°

Notes for Table 2:

- Total angle at which 90% of total luminous flux is captured.
- Viewing angle is the off axis angle from the LED centerline where the luminous intensity is ½ of the peak value.

Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON CX Plus CoB (Gen 2) at specified test current, T_j=85°C.

PART NUMBER	FORWARD VOLTAGE ^[1] (V _f)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE ^[2] (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO CASE ^[3] (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
L2C4-xxxxxS01F0600	32.5	34.5	37.0	-16	2.55
L2C4-xxxxxM02F0900	32.5	34.5	37.0	-16	1.35
L2C4-xxxxxM03F0900	32.5	35.0	37.0	-16	0.90
L2C4-xxxxxL04F1200	32.5	35.0	37.0	-16	0.75
L2C4-xxxxxL05F1200	32.5	35.0	37.0	-16	0.68
L2C4-xxxxxL08F1400	32.5	34.5	37.0	-16	0.57

Notes for Table 3:

- Lumileds maintains a tolerance of ±2% on forward voltage measurements.
- Measured between 25°C and 85°C.
- Thermal resistance is measured between junction and the bottom of the LUXEON CoB substrate.

Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON CX Plus CoB (Gen 2).

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current ^[1, 2]	2x test current, except for S01 rated at 250mA (see derating curve below)
LED Junction Temperature ^[1] (DC & Pulse)	125°C
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 3B
Operating Case Temperature ^[1]	-40°C to 105°C
LED Storage Temperature	-40°C to 105°C
Allowable Reflow Cycles ^[3]	—
Reverse Voltage ($V_{reverse}$)	LUXEON LEDs are not designed to be driven in reverse bias

Notes for Table 4:

- Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
- Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple," are acceptable if the following conditions are met:
 - The frequency of the ripple current is 100Hz or higher
 - The average current for each cycle does not exceed the maximum allowable DC forward current
 - The maximum amplitude of the ripple does not exceed the maximum peak pulsed forward current.
- CoB product shall not be subjected to reflow soldering process.

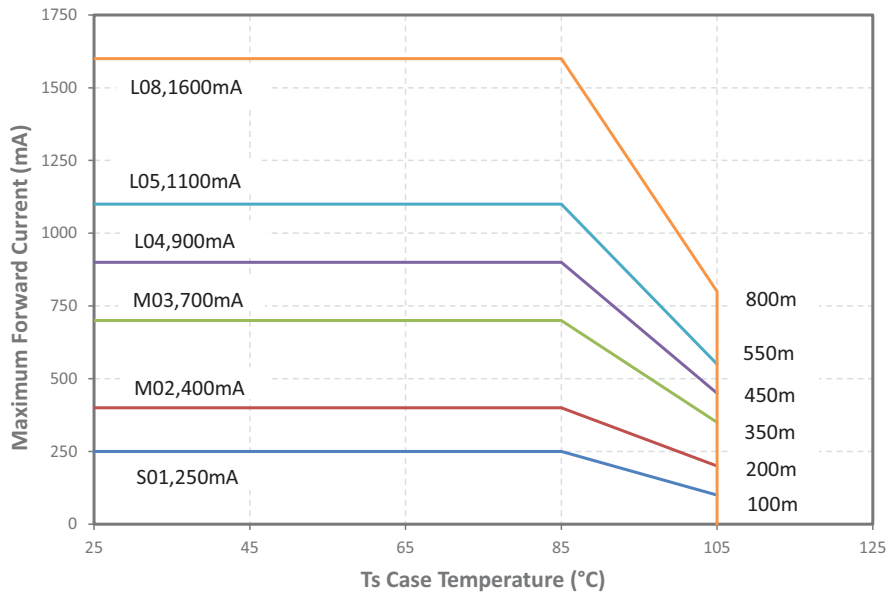


Figure 1. Maximum forward current vs. case temperature for LUXEON CX Plus CoB (Gen 2) at specified test current.

Characteristic Curves

Spectral Power Distribution Characteristics

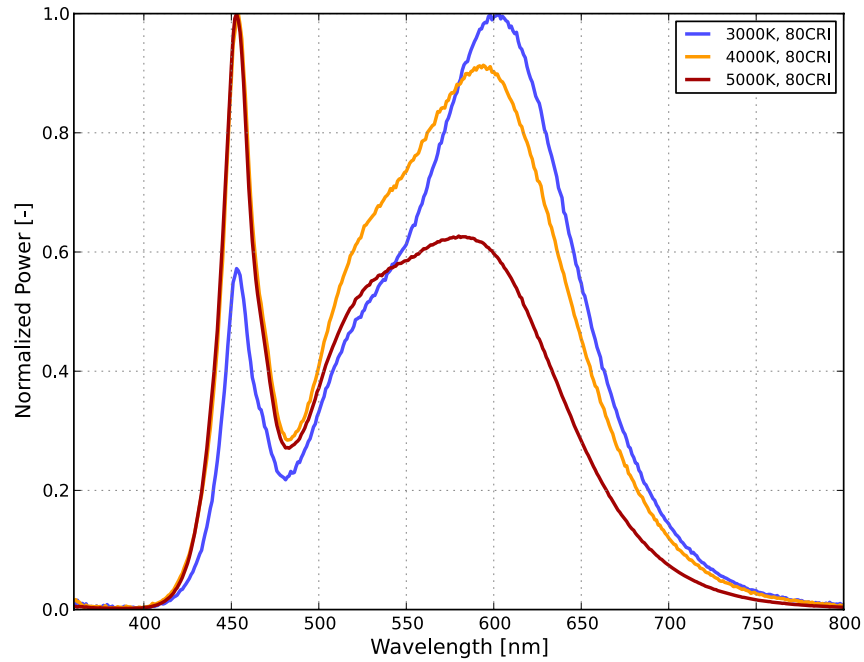


Figure 2a. Typical normalized power vs. wavelength for LUXEON CX Plus CoB (Gen 2) 80CRI at specified test current, $T_j=85^\circ\text{C}$.

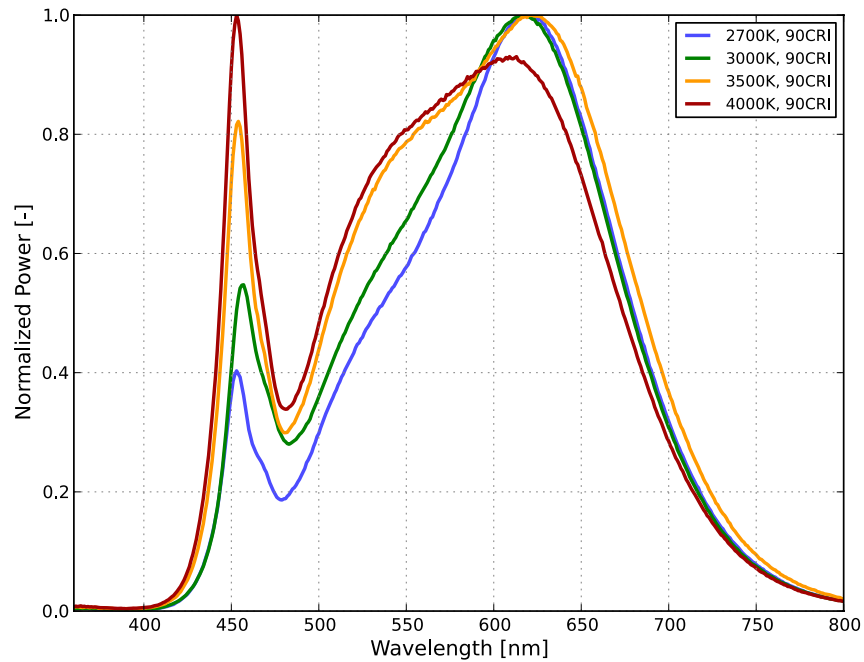


Figure 2b. Typical normalized power vs. wavelength for LUXEON CX Plus CoB (Gen 2) 90CRI at specified test current, $T_j=85^\circ\text{C}$.

Light Output Characteristics

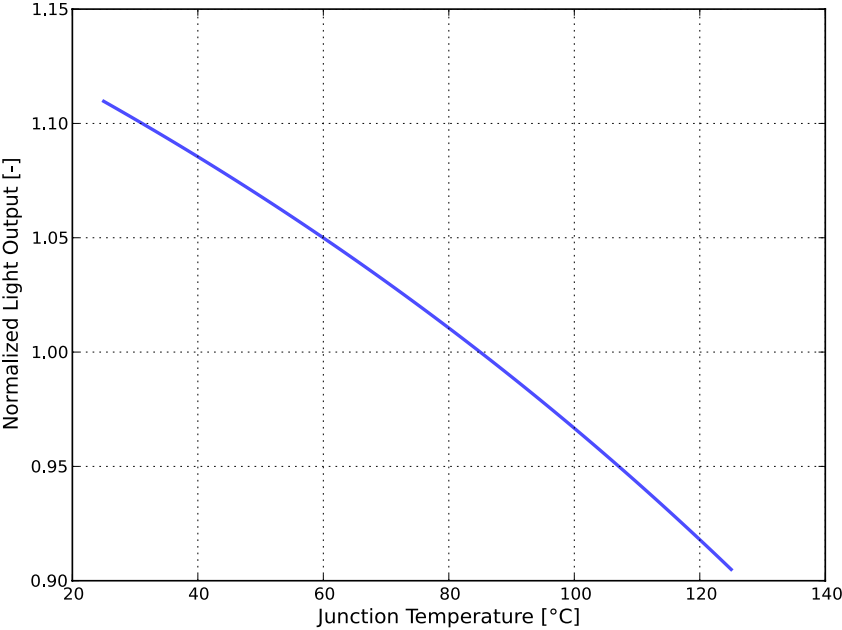


Figure 3. Typical normalized light output vs. junction temperature for LUXEON CX Plus CoB (Gen 2).

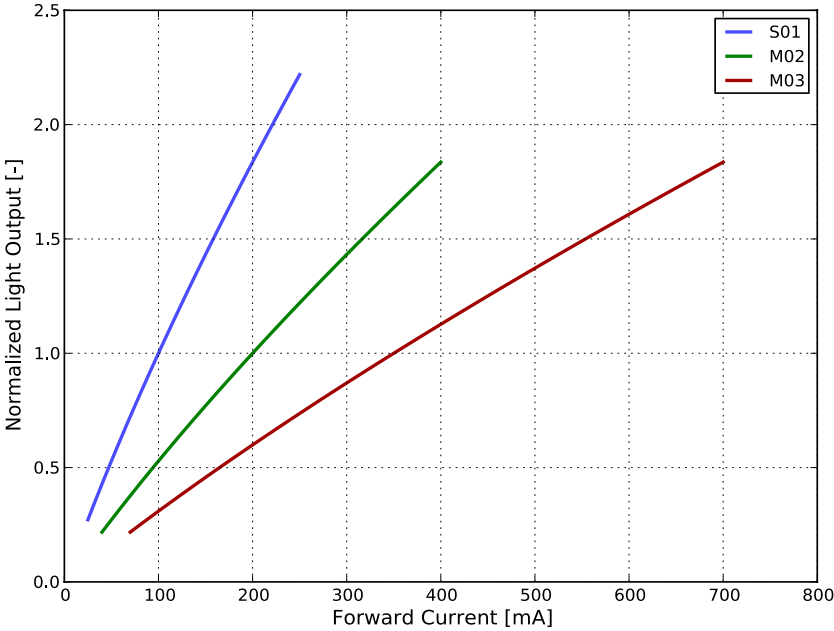


Figure 4a. Typical normalized light output vs. forward current for LUXEON CX Plus CoB (Gen 2) S01, M02 and M03 at $T_j=85^{\circ}\text{C}$.

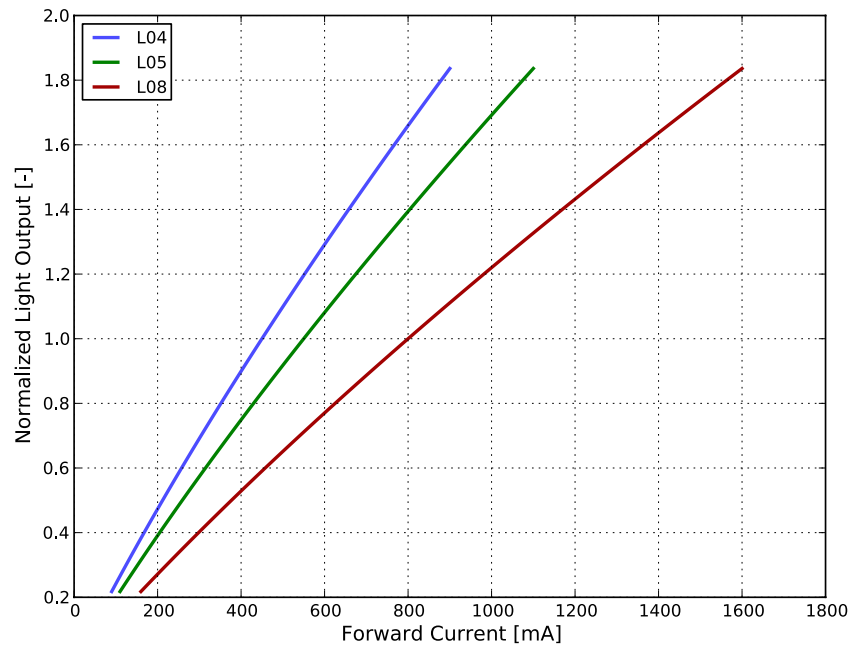


Figure 4b. Typical normalized light output vs. forward current for LUXEON CX Plus CoB (Gen 2) L04, L05 and L08 at $T_j=85^\circ\text{C}$.

Forward Current Characteristics

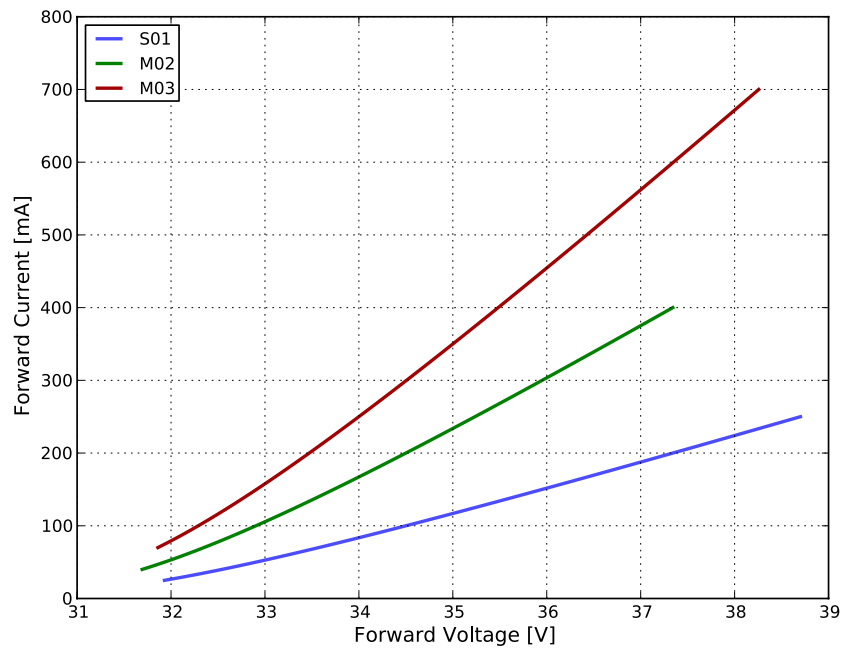


Figure 5a. Typical forward current vs. forward voltage for LUXEON CX Plus CoB (Gen 2) S01, M02 and M03 at $T_j=85^\circ\text{C}$.

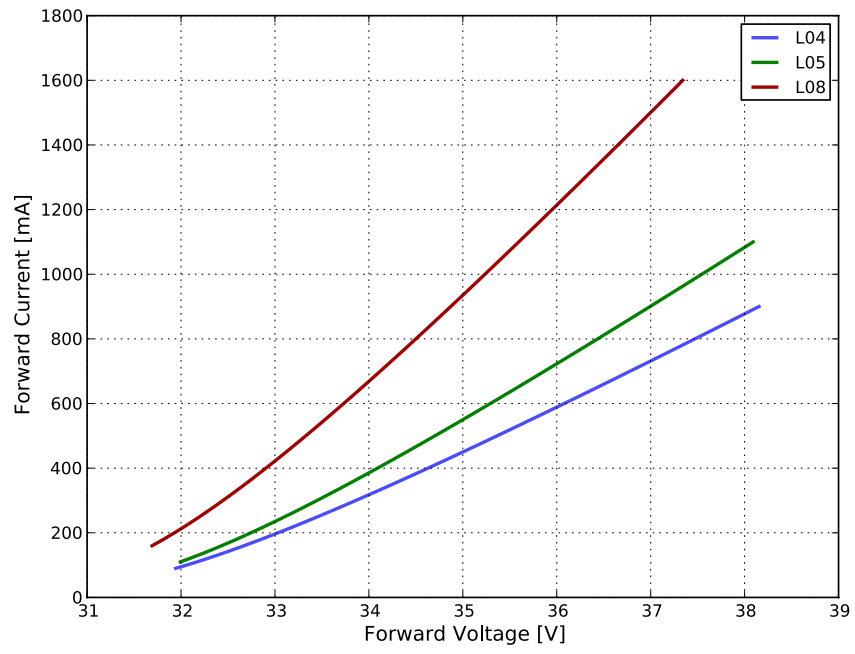


Figure 5b. Typical forward current vs. forward voltage for LUXEON CX Plus CoB (Gen 2) L04, L05 and L08 at $T_j=85^\circ\text{C}$.

Radiation Pattern Characteristics

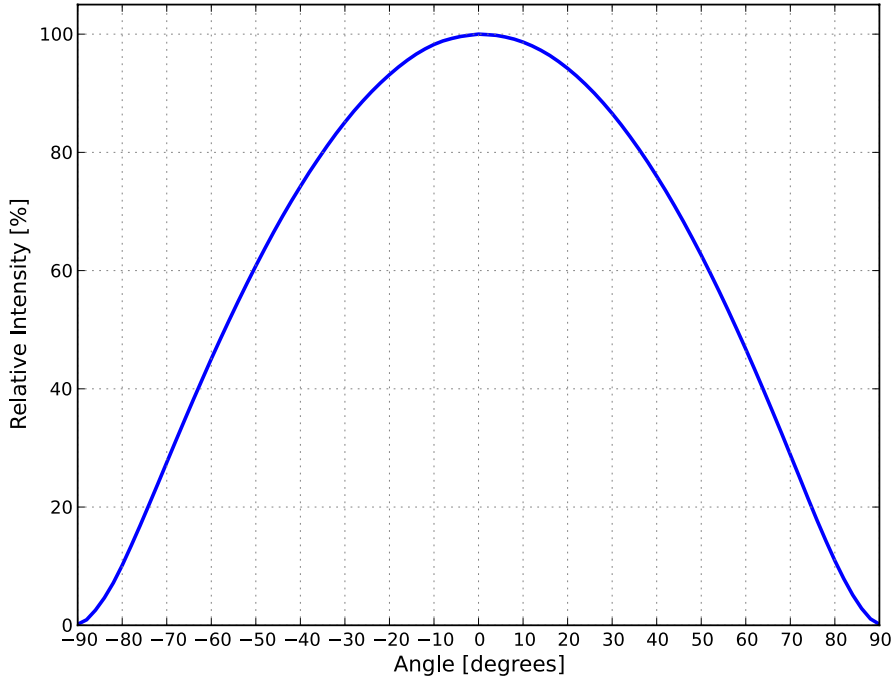


Figure 6. Typical radiation pattern for LUXEON CX Plus CoB (Gen 2) at specified test current, $T_j=85^{\circ}\text{C}$.

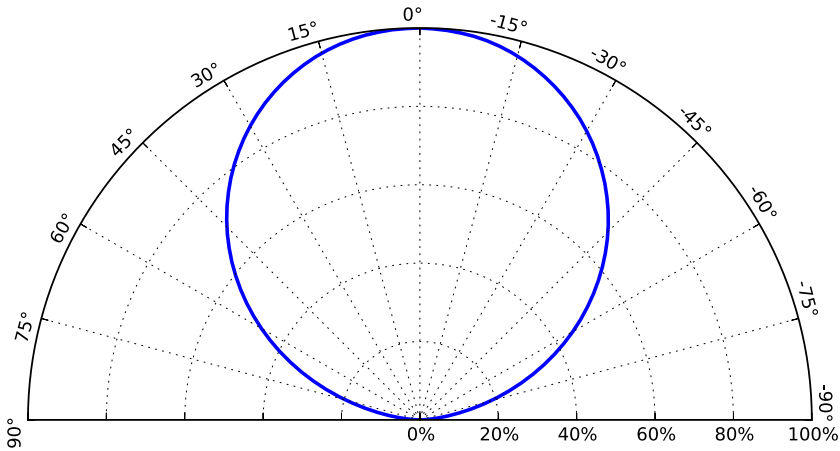


Figure 7. Typical polar radiation pattern for LUXEON CX Plus CoB (Gen 2) at specified test current, $T_j=85^{\circ}\text{C}$.

Color Bin Definitions

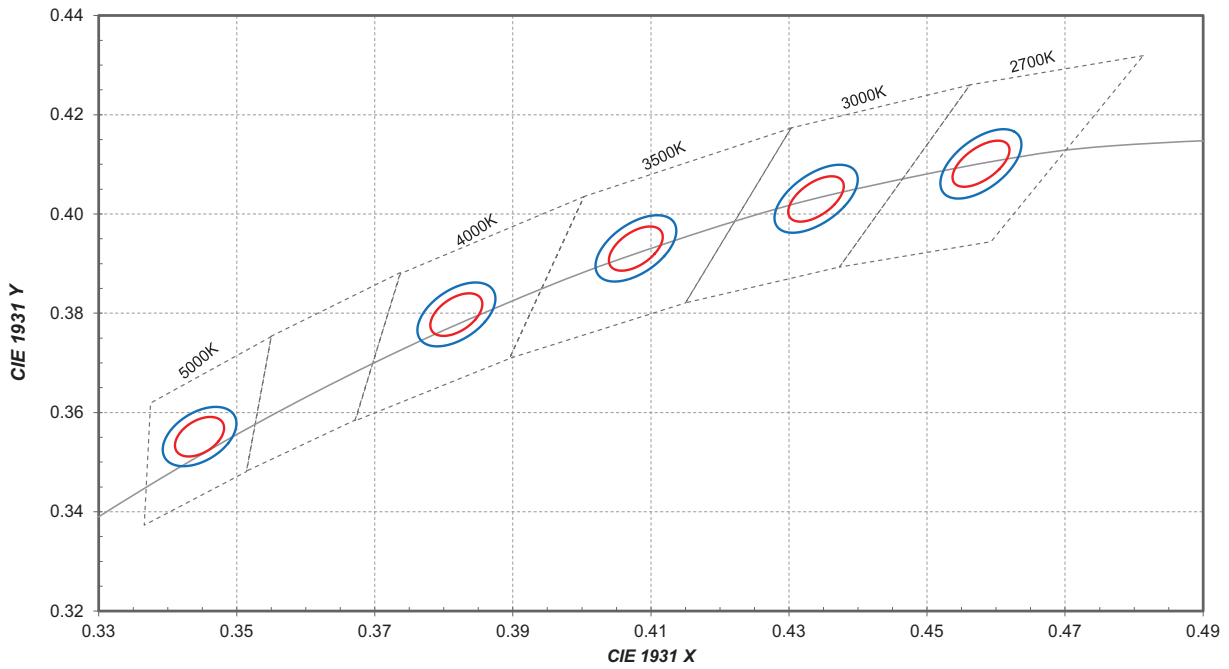


Figure 8. 2- and 3-step MacAdam ellipse illustration for Table 5.

Table 5. 2- and 3-step MacAdam ellipse color bin definitions for LUXEON CX Plus CoB (Gen 2).

NOMINAL CCT	CENTER POINT ^[1] (cx, cy)	2 SDCM		3 SDCM		ELLIPSE ROTATION ANGLE, θ
		MAJOR AXIS, a	MINOR AXIS, b	MAJOR AXIS, a	MINOR AXIS, b	
2700K	(0.4578, 0.4101)	0.00540	0.00280	0.00810	0.00420	53.70°
3000K	(0.4338, 0.4030)	0.00556	0.00272	0.00834	0.00408	53.20°
3500K	(0.4073, 0.3917)	0.00618	0.00276	0.00927	0.00414	54.00°
4000K	(0.3818, 0.3797)	0.00626	0.00268	0.00939	0.00402	53.70°
5000K	(0.3447, 0.3553)	0.00548	0.00236	0.00822	0.00354	59.60°

Notes for Table 5:

1. Lumileds maintains a tolerance of ± 0.005 on x and y coordinates in the CIE 1931 color space.

Packaging and Labeling Information

Table 6. Number of LEDs per tray and per inner box for LUXEON CX Plus CoB (Gen 2).

PART NUMBER	TOTAL UNITS PER TRAY	TOTAL TRAYS PER INNER BOX	TOTAL UNITS PER INNER BOX
L2C4-xxxxxS01F0600	90	2	180
L2C4-xxxxxM02F0900	72	2	144
L2C4-xxxxxM03F0900	72	2	144
L2C4-xxxxxL04F1200	56	2	112
L2C4-xxxxxL05F1200	56	2	112
L2C4-xxxxxL08F1400	56	2	112

Tray Dimensions

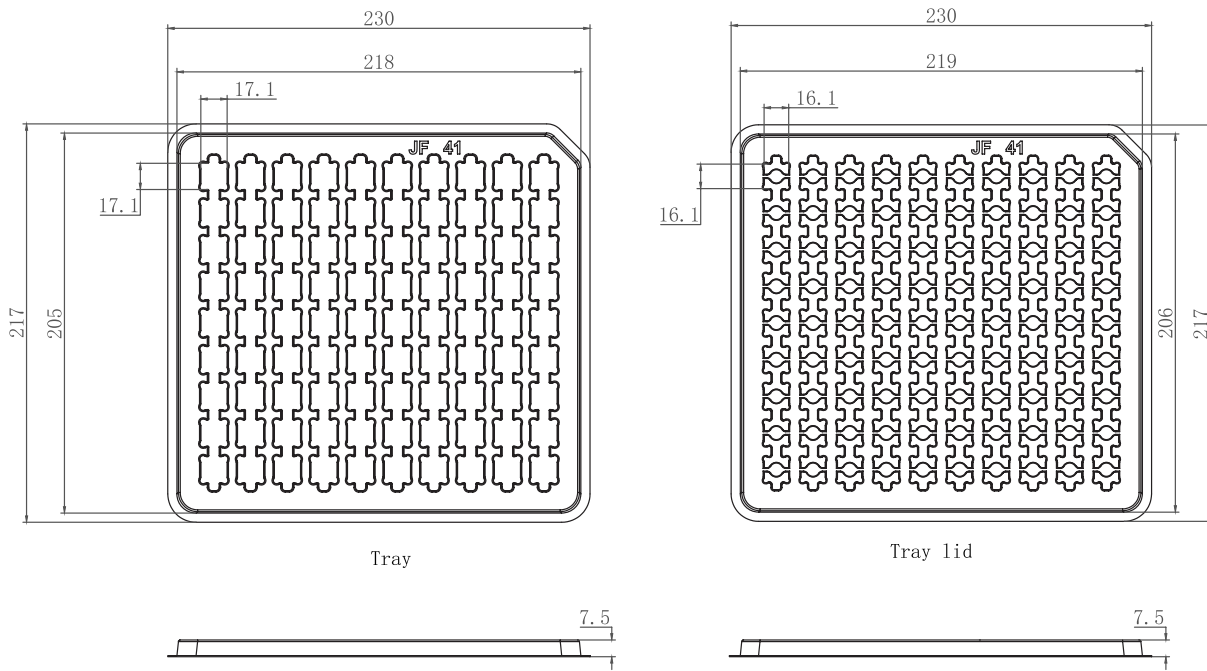


Figure 10a. Tray dimensions for L2C4-xxxxxS01F0600.

Notes for Figure 10a:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

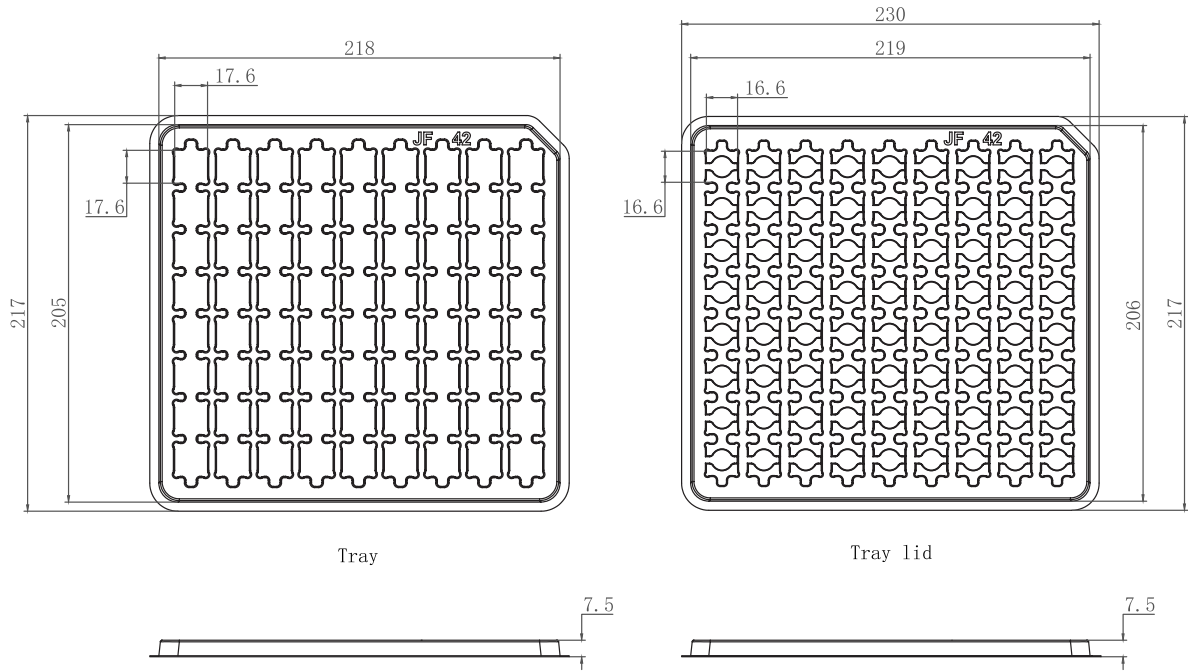


Figure 10b. Tray dimensions for L2C4-xxxxxM02F0900 and L2C4-xxxxxM03F0900.

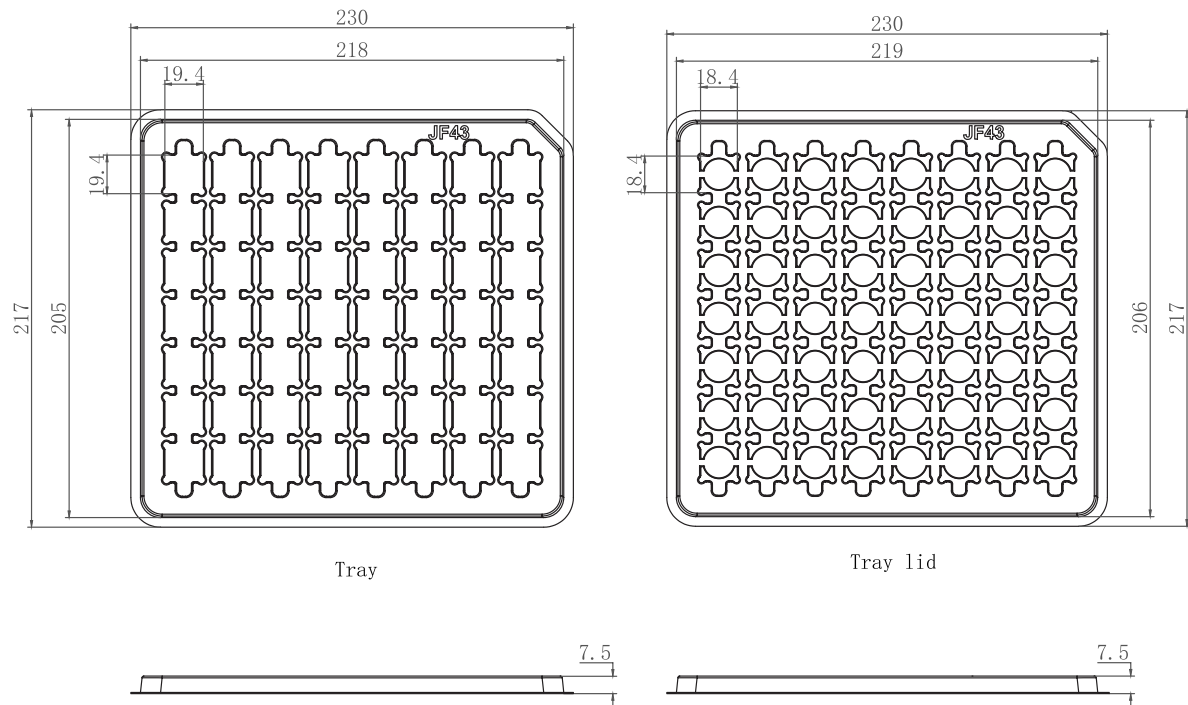


Figure 10c. Tray dimensions for L2C4-xxxxxL04F1200, L2C4-xxxxxL05F1200, and L2C4-xxxxxL08F1400.

- Notes for Figures 10b and 10c:
1. Drawings are not to scale.
 2. All dimensions are in millimeters.

Inner Box

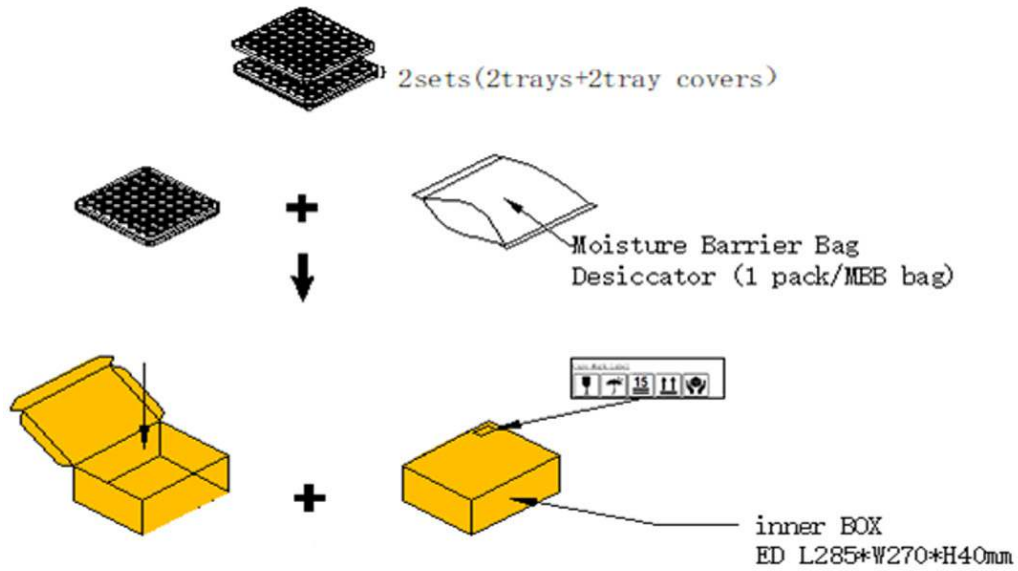


Figure 11. Dimensions for inner box packaging for LUXEON CX Plus CoB (Gen 2).

Table 7. Inner box information for LUXEON CX Plus CoB (Gen 2)

BOX TYPE	DIMENSIONS (mm)			AVERAG	AVERAG	AVERAGE WEIGHT (180pcs/box)
	H	L	W			
Inner box	40	285	270	0.385Kg	0.395Kg	0.4Kg



Figure 12. Example of a tray, MBB bag, and inner box label for LUXEON CX Plus CoB (Gen 2).

Notes for Figure 12 – Inner Box Label descriptions for customer use:

Field labels not described are for Lumileds internal use only.

1. Number of LED emitters in an MBB bag.
2. Lumileds part number.
3. Customer part number for custom requests only.
4. LED test date in YYWW format.
5. Unique production lot identification number. This number is required for traceability purpose.
6. Product category code.
7. EU regulatory address.

Outer Box

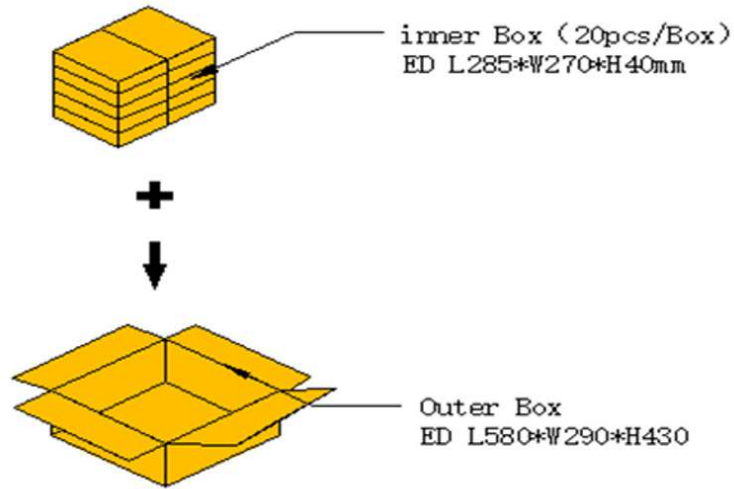


Figure 13. Dimensions for outer box packaging for LUXEON CX Plus CoB (Gen 2).

Table 8. Outer box information for LUXEON CX Plus CoB – High Density.

BOX TYPE	DIMENSIONS (mm)			MAXIMUM INNER BOX PER OUTER BOX	AVERAGE WEIGHT (3600pcs/box)	AVERAGE WEIGHT (2880pcs/box)	AVERAGE WEIGHT (2240pcs/box)
	H	L	W				
Outer Box	430	580	290	20	8.563Kg	8.763Kg	8.856Kg

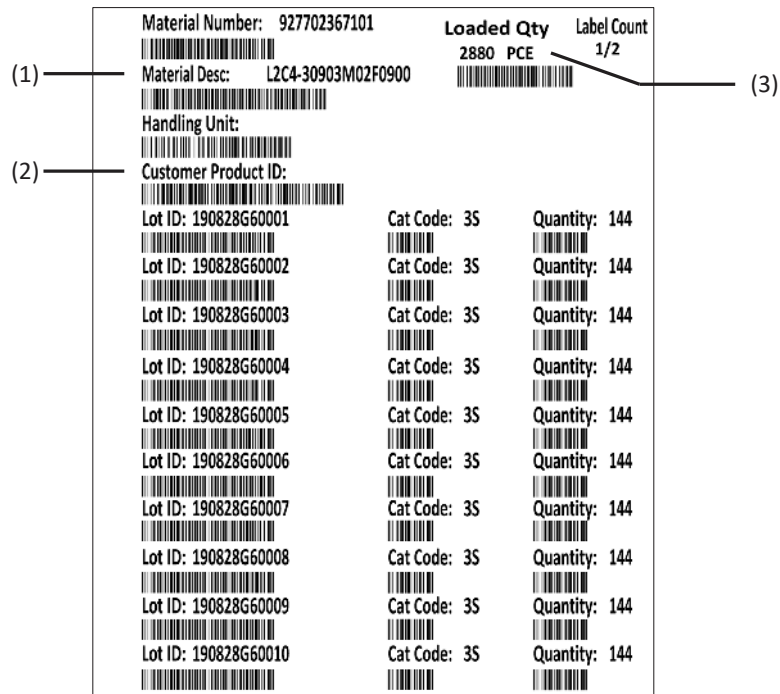


Figure 14. Example of outer box label for LUXEON CX Plus CoB (Gen 2).

- Notes for Figure 14 – Outer Box Label descriptions for customer use:
 Field labels not described are for Lumileds internal use only.
1. Lumileds part number.
 2. Customer part number for custom requests only.
 3. Total number of LED emitters in a shipment box.

About Lumileds

Companies developing automotive, mobile, IoT and illumination lighting applications need a partner who can collaborate with them to push the boundaries of light. With over 100 years of inventions and industry firsts, Lumileds is a global lighting solutions company that helps customers around the world deliver differentiated solutions to gain and maintain a competitive edge. As the inventor of Xenon technology, a pioneer in halogen lighting and the leader in high performance LEDs, Lumileds builds innovation, quality and reliability into its technology, products and every customer engagement. Together with its customers, Lumileds is making the world better, safer, more beautiful—with light.

To learn more about our lighting solutions, visit lumileds.com.